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Gempler

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(54) **HORIZONTAL STAND ASSEMBLY**

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F41J 1/10 (2006.01)
B25H 1/06 (2006.01)

(52) **U.S. Cl.**
CPC ***F41J 1/10*** (2013.01); *B25H 1/06* (2013.01)

(58) **Field of Classification Search**
CPC F41J 1/00; F41J 1/10; B25H 1/06; E04G 1/32
USPC 273/403–410, 390–392; 472/118, 125; 248/121, 164; 182/224–227
See application file for complete search history.

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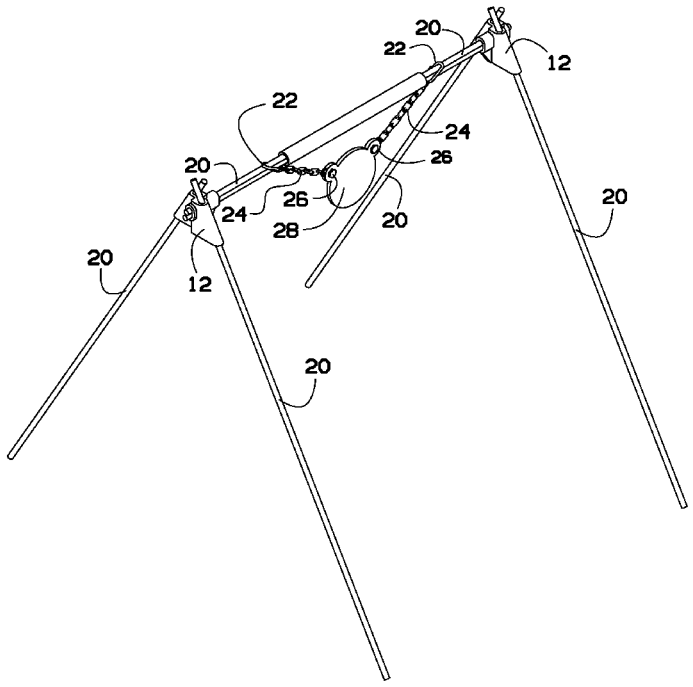
(57) **ABSTRACT**

A horizontal stand assembly enables a user to mount a target for shooting which can be easily repaired, relocated or stored. The horizontal stand assembly includes a first bracket connected to a second bracket where each bracket has an offset trapezoidal shape with a front angled cavity which angles backward and is offset from a rear angled cavity which angles frontward such that each bracket can accommodate a front post in the front angled cavity and a rear post in the rear angled cavity. Each bracket further comprises a horizontal cavity such that horizontal posts can be placed through each horizontal cavity connecting the first bracket to the second bracket such that the target can be hung from the horizontal posts without deflecting.

6 Claims, 3 Drawing Sheets



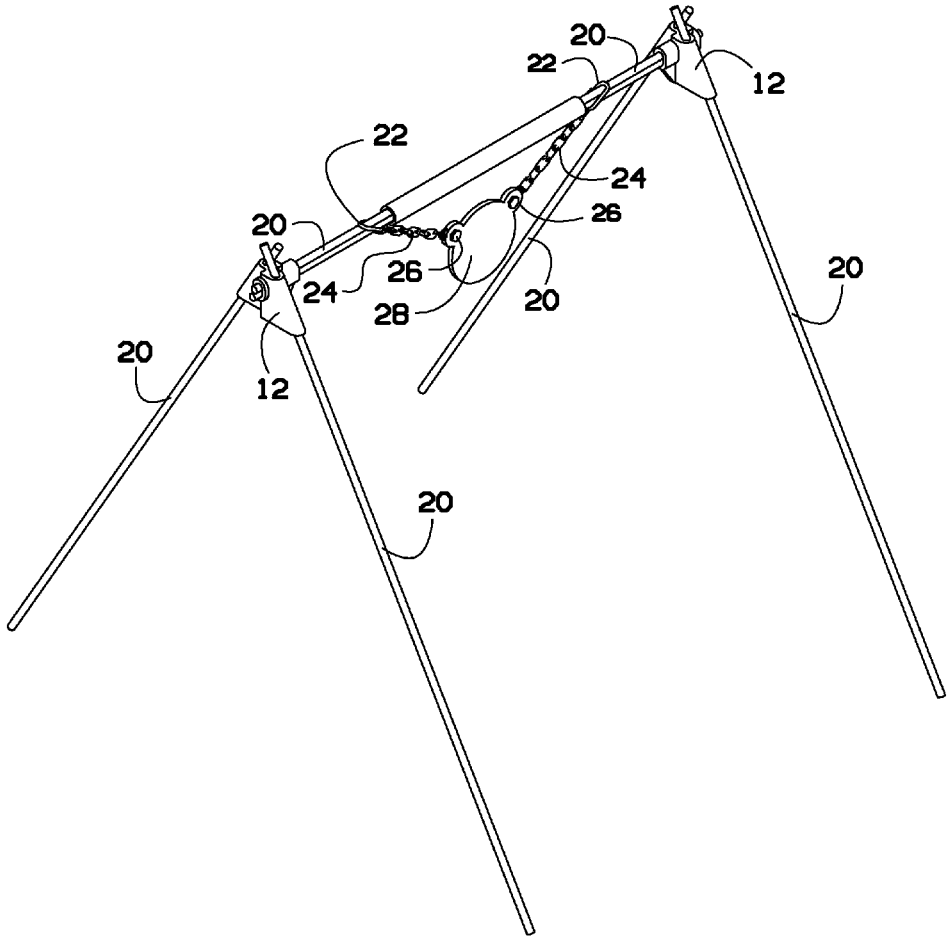


FIG. 1

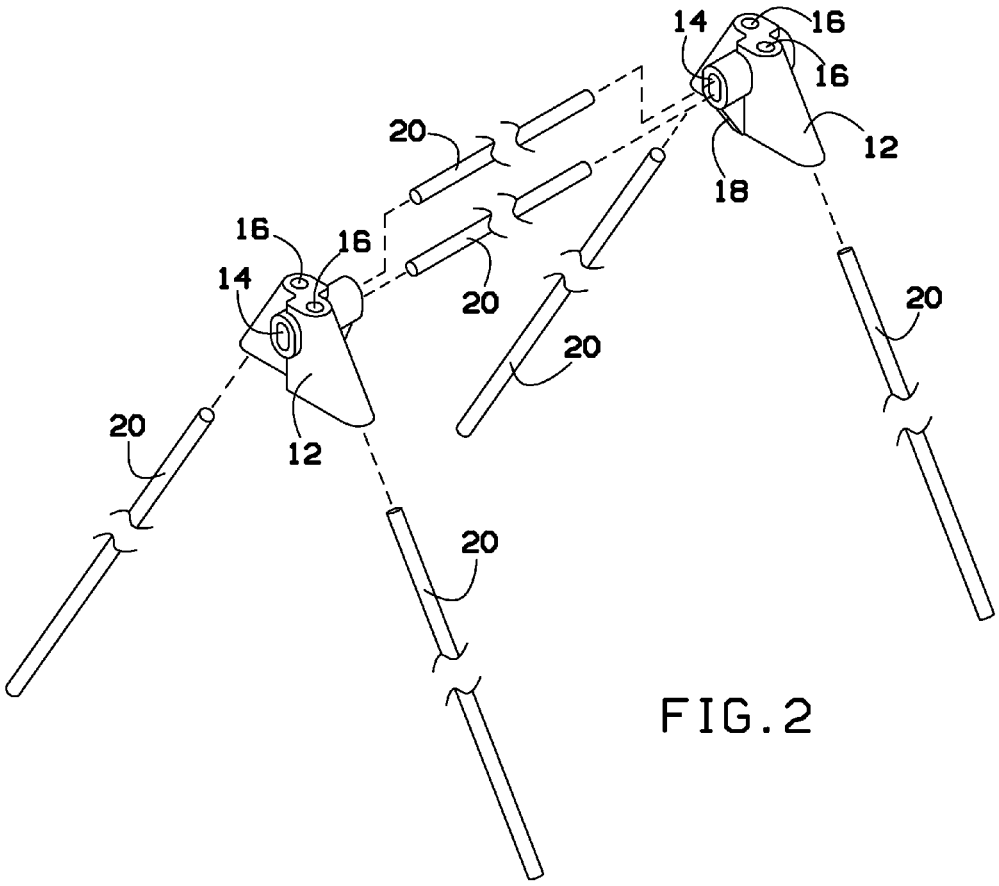


FIG. 2

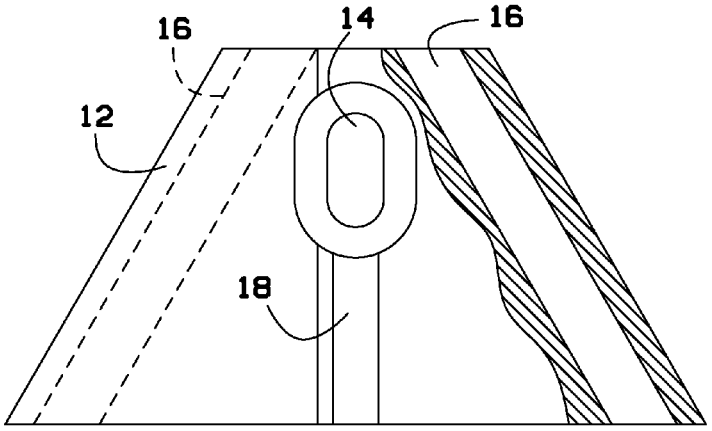


FIG. 3

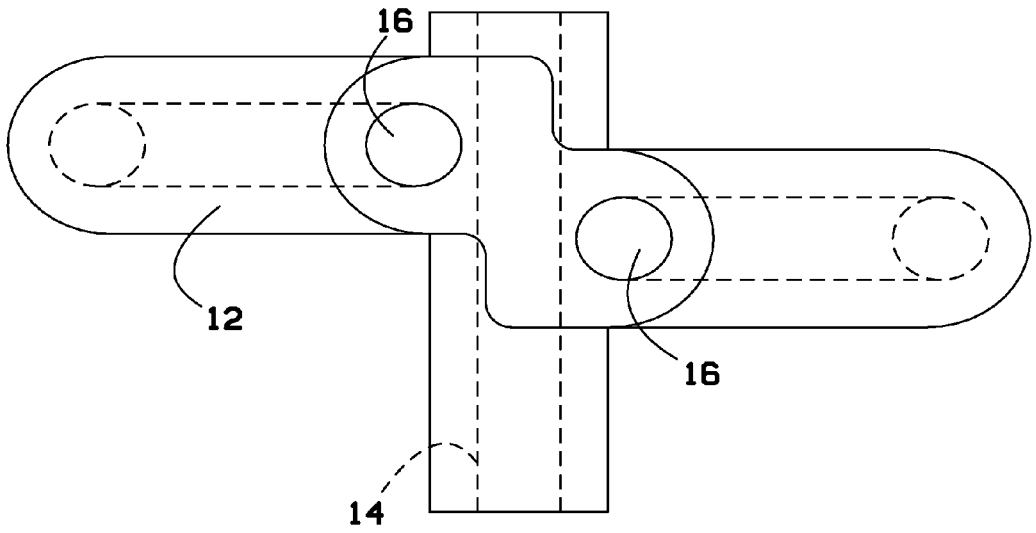


FIG. 4

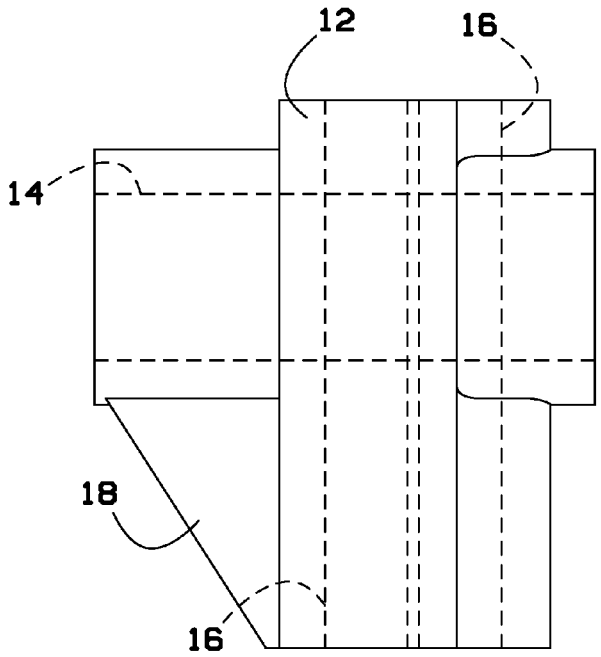


FIG. 5

HORIZONTAL STAND ASSEMBLY

CROSS REFERENCE TO RELATED APPLICATIONS

This application claims priority to U.S. Provisional Patent Application 61/673,060 filed on Jul. 18, 2012.

FIELD OF THE INVENTION

This invention relates to devices that can mount horizontal surfaces.

BACKGROUND OF THE INVENTION

Prior to the disclosed invention, target stands were homemade, cumbersome, non-adjustable, heavy, unstable and not durable. Usually a damaged component of a prior art target stand results in the failure of the whole product. Further, prior art target stands cannot be easily repaired, relocated or stored due to their designs, construction and weight. Embodiments of the present invention solve these problems.

BRIEF SUMMARY OF THE INVENTION

A horizontal stand assembly enables a user to mount a target for shooting which can be easily repaired, relocated or stored. The horizontal stand assembly includes a first bracket connected to a second bracket where each bracket has an offset trapezoidal shape with a front angled cavity which angles backward and is offset from a rear angled cavity which angles frontward such that each bracket can accommodate a front post in the front angled cavity and a rear post in the rear angled cavity. Each bracket further comprises a horizontal cavity such that horizontal posts can be placed through each horizontal cavity connecting the first bracket to the second bracket such that the target can be hung from the horizontal posts without deflecting.

BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWINGS

Having thus described the invention in general terms, reference will now be made to the accompanying drawings, which are not necessarily drawn to scale, and wherein:

FIG. **1** is a perspective view of an embodiment of the invention shown in use.

FIG. **2** is an exploded view of an embodiment of the invention.

FIG. **3** is a front view of an embodiment of the invention.

FIG. **4** is a top view of an embodiment of the invention.

FIG. **5** is a side view of an embodiment of the invention.

DETAILED DESCRIPTION OF THE INVENTION

Embodiments of the present invention overcome many of the obstacles associated with hanging a target at which to shoot, and now will be described more fully hereinafter with reference to the accompanying drawings that show some, but not all embodiments of the claimed inventions. Indeed, the invention may be embodied in many different forms and should not be construed as limited to the embodiments set forth herein. Rather, these embodiments are provided so that this disclosure will satisfy applicable legal requirements. Like numbers refer to like elements throughout.

FIG. **1** shows an embodiment of the horizontal stand assembly in use. The horizontal stand assembly comprises a

first bracket **12** which is immediately adjacent to a first front post **20**, a first rear post **20**, a first horizontal post **20** and a second horizontal post **20**.

The first horizontal post **20** and the second horizontal post **20** are immediately adjacent to a second bracket **12**. The second bracket **12** is immediately adjacent to a second front post **20** and a second rear post **20**.

The horizontal stand assembly can support target **28** by having a user mechanically couple target **28** to right chain **24** with right bolt **26**. Right chain **24** is mechanically coupled to right carabiner **22** which can be placed over first horizontal post **20** and the second horizontal post **20**. Likewise, target **28** is further mechanically coupled to left chain **24** with left bolt **26**. Left chain **24** is mechanically coupled to left carabiner **22** which can be placed over first horizontal post **20** and the second horizontal post **20**.

The construction has many advantages, for instance, first horizontal post **20** and second horizontal post **20** do not need to be level to ground, rather gravity will have target **28** hang perpendicular to ground. This effect can be increased by ensuring that the coefficient of static friction between each carabiner **22** and horizontal posts **20** is sufficient that either carabiner **22** does not slide down horizontal posts **20**. In some embodiments, this can be accomplished by placing a high friction surface over first horizontal post **20** and second horizontal post **20**. Nonetheless, bracket **12** possesses many features which ensure that first horizontal post **20** and second horizontal post **20** are nearly parallel to ground.

FIG. **2**, FIG. **3**, FIG. **4** and FIG. **5** show bracket **12** in more detail. Bracket **12** has an offset trapezoidal shape with a front angled cavity **16** which angles backward and is offset from a rear angled cavity **16** which angles frontward. Two legs may be inserted by sliding a post **20** into each bracket **12** and then spreading the posts **20** from each other to the desired angle to provide the triangular leg arrangement and engage the friction lock bump within cavity **16**. In one embodiment, front angled cavity **16** and rear angled cavity **16** each form a friction fit with front post **20** and rear post **20**, respectively. In one embodiment, horizontal cavity **14** forms a friction fit with horizontal posts **20**. Bracket **12** further comprises horizontal cavity **14**. Bracket **12** can be additionally reinforced with gusset **18**. As used in this application "each bracket" refers to both first bracket **12** and second bracket **12**. This configuration offers several advantages, a few of which are enumerated below.

FIG. **2** and FIG. **3** show how first horizontal post **20** and second horizontal post **20** can fit between first bracket **12** and second bracket **12**. In some embodiments, target **28** can be made of metal, is heavy and could potentially deflect a single horizontal post **20**. That problem is solved by arranging a pair of horizontal posts in such that first horizontal post **20** and second horizontal post **20** fit snugly inside horizontal cavity **14**, but still can slide in and out of horizontal cavity **14**. Traditional engineering would eschew this design since the tightness of first horizontal post **20** and second horizontal post **20** inside horizontal cavity **14** would render the system statically indeterminable and loading conditions would not be readily discerned.

The loading conditions include the normal force on right carabiner **22** and left carabiner **22** called N_C and can also include dynamic and vibration forces that can occur as a result of shooting a bullet at target **28** which can be modeled as force normal target **28** called N_T. In particular, the dynamic vibration component of N_T can be mitigated with the following design features: first, the use of right chain **24** and left chain **24** allow for the weight of target **28** to absorb a substantial amount of vibration. Second, a user can use rebar for all posts

20 which is particularly resilient to both static and dynamic force. Third, by snugly placing first horizontal post **20** and second horizontal post **20** inside horizontal cavity **14**, without actually affixing first horizontal post **20** and second horizontal post **20** inside horizontal cavity **14**.

Nonetheless, there will still be a component of N_T in both the normal and orthogonal directions that cannot be mitigated and will be applied to first front post **20**, first rear post **20**, second front post **20** and second rear post **20**. The present invention handles this force in the following ways: First, the offset trapezoidal shape of bracket **12** prevents a front post **20** from contacting a rear post **20** and thus avoids a vibration multiplier effect of having the two poles directly contact each other. To the extent traditional camping tents may be similar, direct pole contact in those designs teaches away from the present invention. Second, at different points of movement of target **28**, the front posts **20** or the rear posts **20** could have a higher load. The present invention resolves this by having an bracket **14** take the shape of a regular trapezoid (offset as noted above) where front angled cavity **16** is parallel to a first side and rear angled cavity **16** is parallel to a second side, this assures relatively uniform loading as target **28** moves back and forth.

By having posts **20** immediately adjacent to, but not mechanically coupled to brackets **12**, the horizontal stand assembly can be easily repaired, relocated or stored.

That which is claimed:

1. A horizontal target stand assembly comprising:

a first bracket and a second bracket, where each of the first bracket and the second bracket has an offset trapezoidal shape with a front angled cavity which angles backward and is offset from a rear angled cavity which angles frontward such that each bracket can accommodate a front post in the front angled cavity and a rear post in the rear angled cavity; each of the first bracket and the second bracket further comprising an oblong horizontal cavity such that two parallel adjacent horizontal posts can be placed through each horizontal cavity connecting the first bracket to the second bracket; and

two parallel adjacent horizontal posts passing through the oblong horizontal cavity of the first bracket and the oblong horizontal cavity of the second bracket.

2. The horizontal stand assembly of claim **1**, wherein:

a target is mechanically coupled to a right chain which is further affixed to the horizontal posts with a right carabiner; and the target is further mechanically coupled to left chain which is further affixed to the horizontal posts with a left carabiner to reduce a vibration component of a normal force created on the target when struck with a bullet.

3. The horizontal stand assembly of claim **2**, wherein:

each front angled cavity is parallel to a first side on each bracket and each rear angled cavity is parallel to a second side on each bracket to assure relatively uniform loading as the target moves when struck with a bullet.

4. The horizontal stand assembly of claim **1**, further comprising a target hanging from the two parallel adjacent horizontal posts.

5. The horizontal stand assembly of claim **1**, wherein:

the front angled cavity forms a friction fit with the front post;

the rear angled cavity forms a friction fit with the rear post; and

the horizontal cavity forms a friction fit with the horizontal posts.

6. A method of assembling a target stand, comprising:

inserting a front post into a front cavity of a first target stand bracket;

inserting a rear post into a rear cavity of the first target stand bracket, wherein the first target stand bracket has an offset trapezoidal shape with the front cavity having a backward angle and the rear cavity having a frontward angle;

adjusting a height of the front post by longitudinally sliding the front post within the front cavity;

adjusting a height of the rear post by longitudinally sliding the rear post within the rear cavity;

locking the front post into the first target stand bracket by forming a friction fit with the front post in the front cavity;

locking the rear post into the first target stand bracket by forming a friction fit with the rear post in the rear cavity;

inserting two parallel adjacent horizontal posts into an oblong horizontal cavity of the first target stand bracket; and

connecting the first target stand bracket to a second target stand bracket by the two horizontal posts, the second target stand bracket having a substantially similar structure as the first target stand bracket.

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